

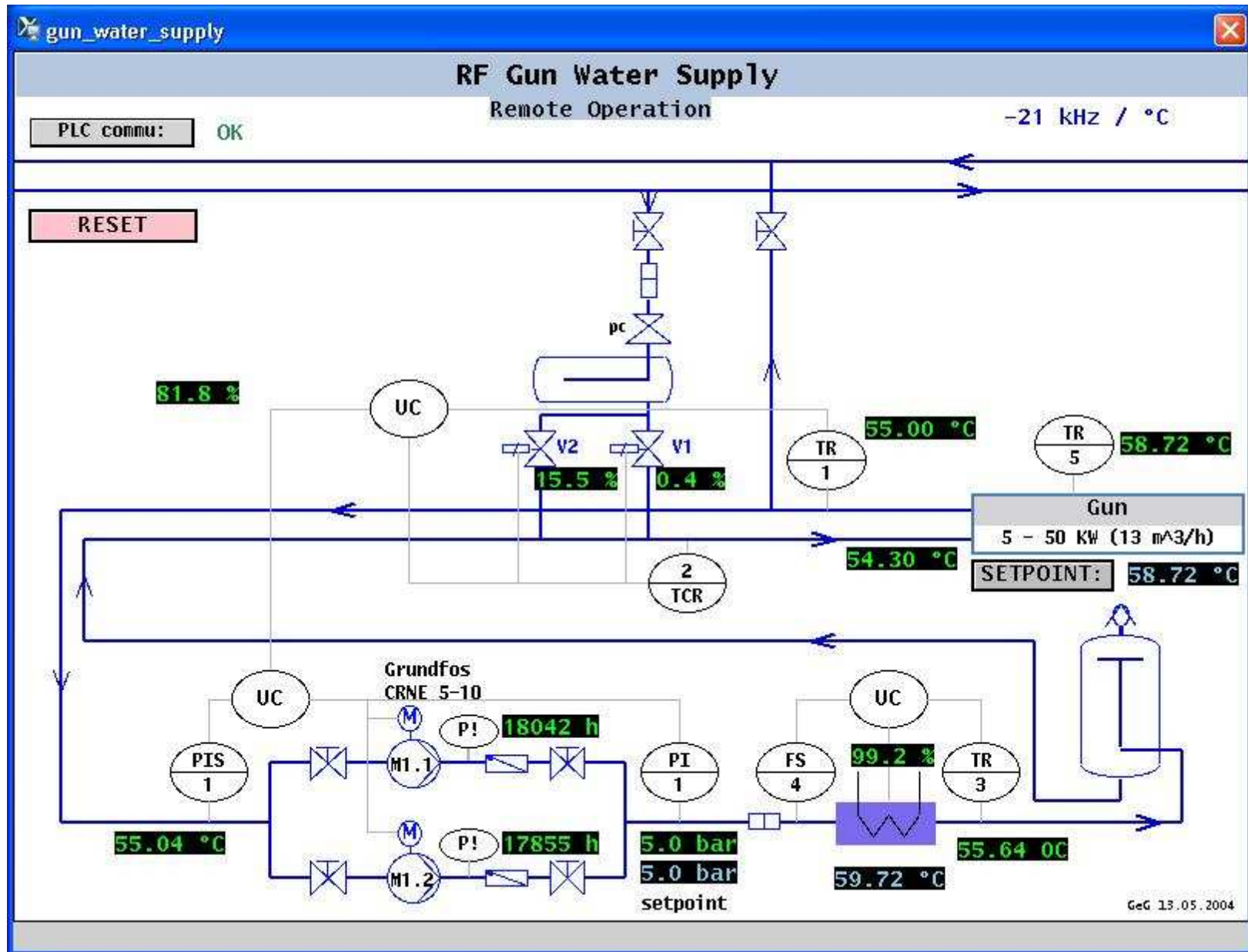
# Automation of the Gun

M.Grecki, MSK Group

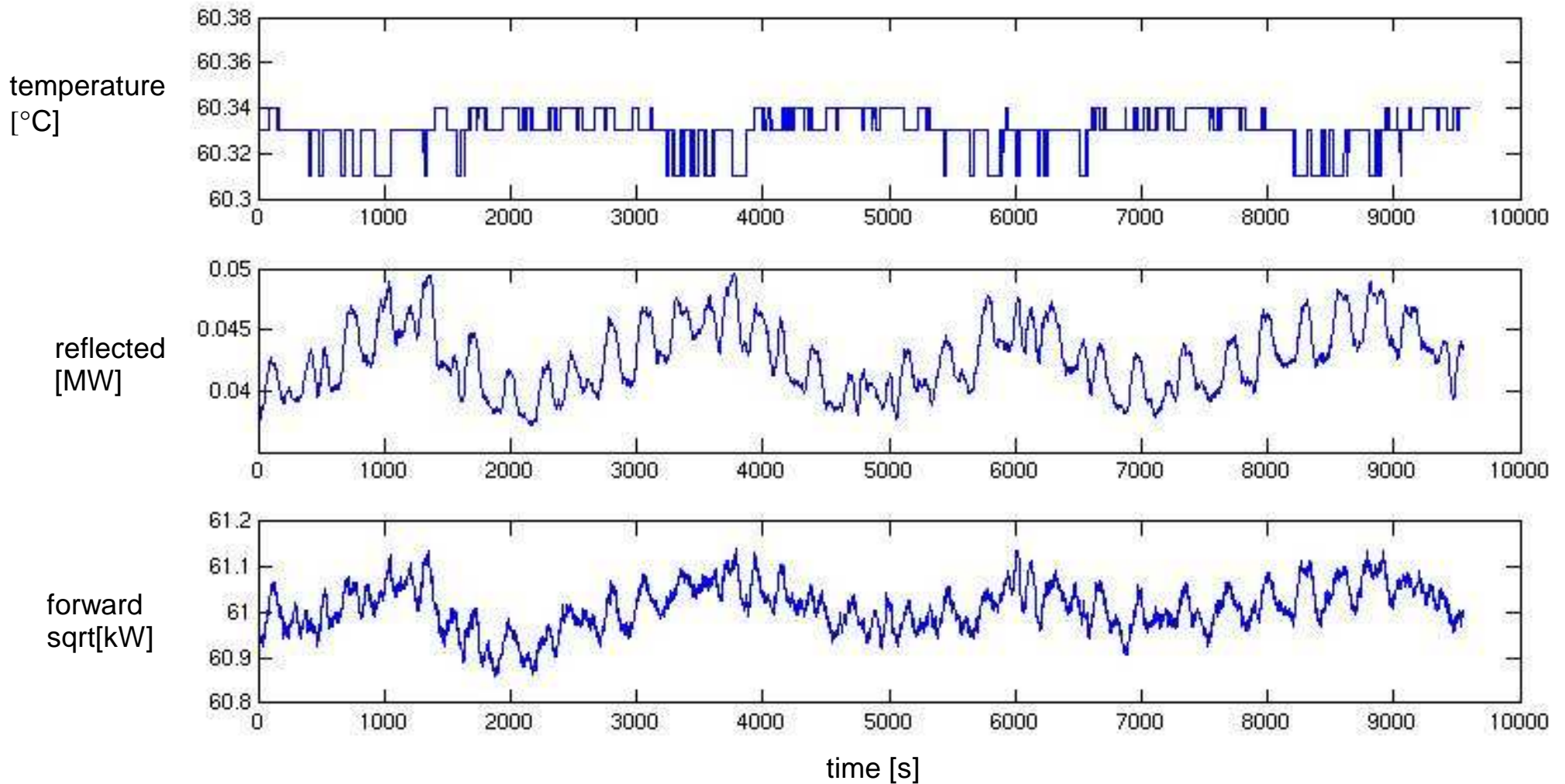
# GUN at FLASH

- normal conducting cavity
- power dissipation 5-50kW
- -21kHz / °C
- operating temperature ~59°C
- Iris temperature stabilized by water cooling
  - works perfectly in steady-state conditions
  - long transients when RF power fluctuates

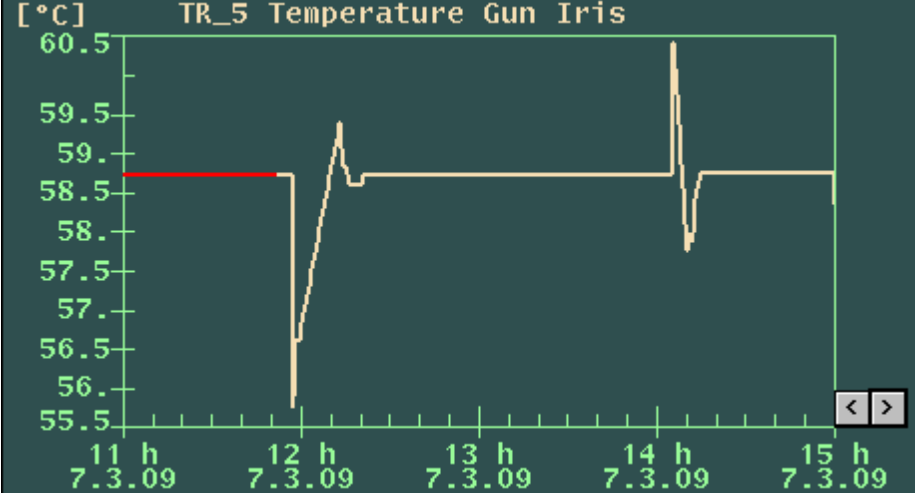
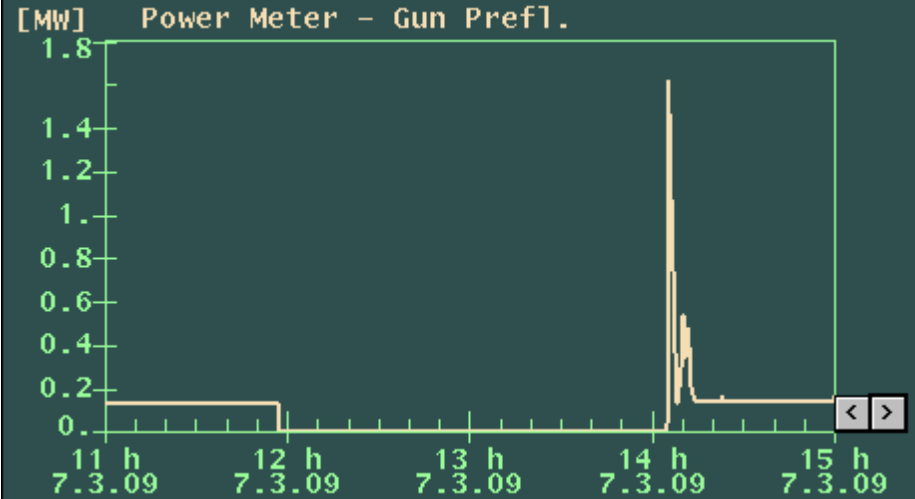
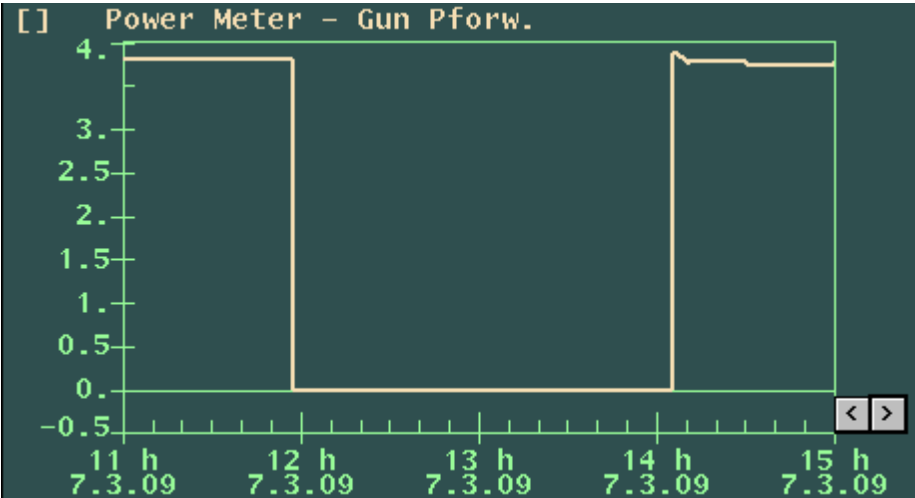
# Gun temperature regulation



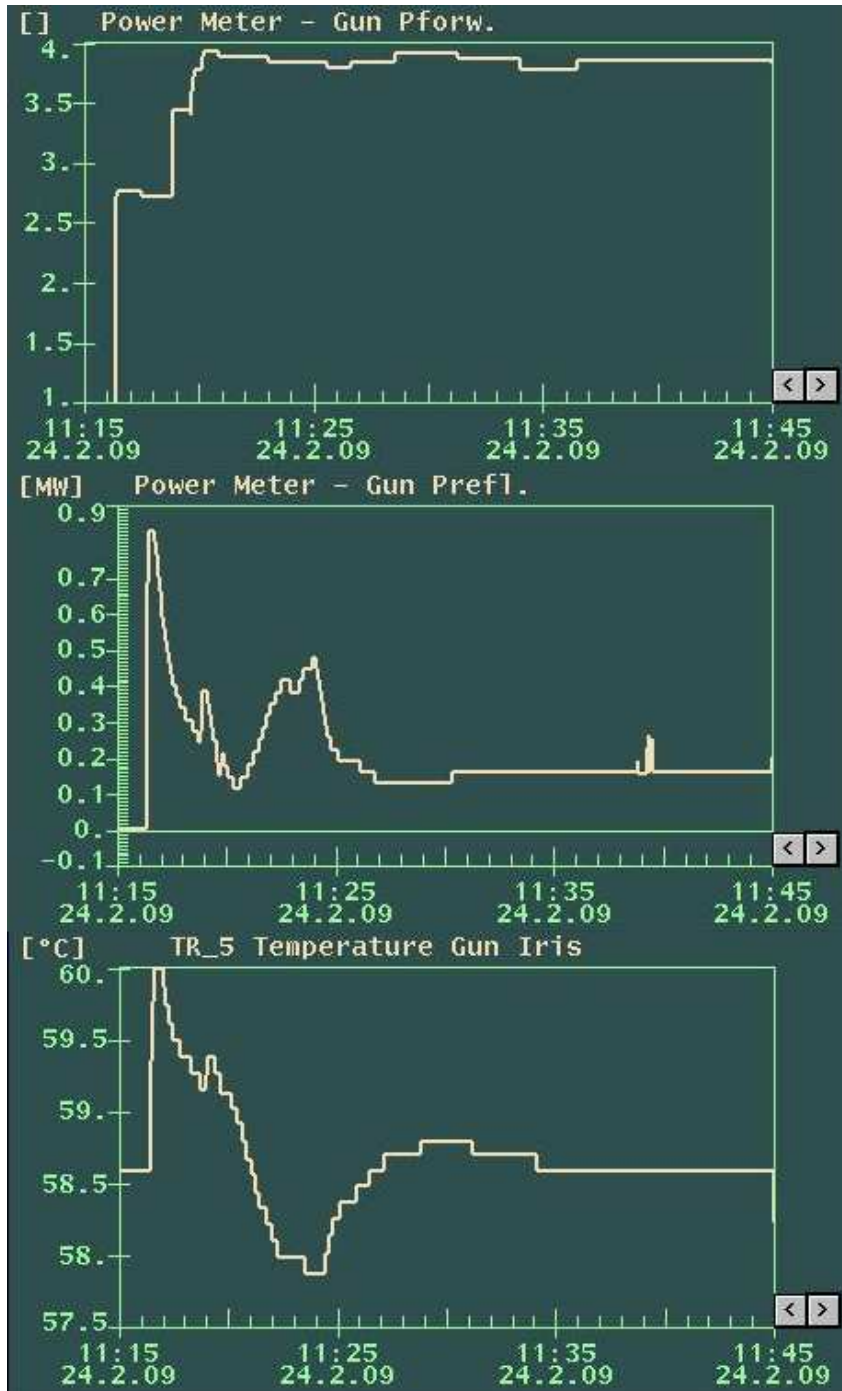
# GUN temperature & klystron power (steady-state, FF+FB)



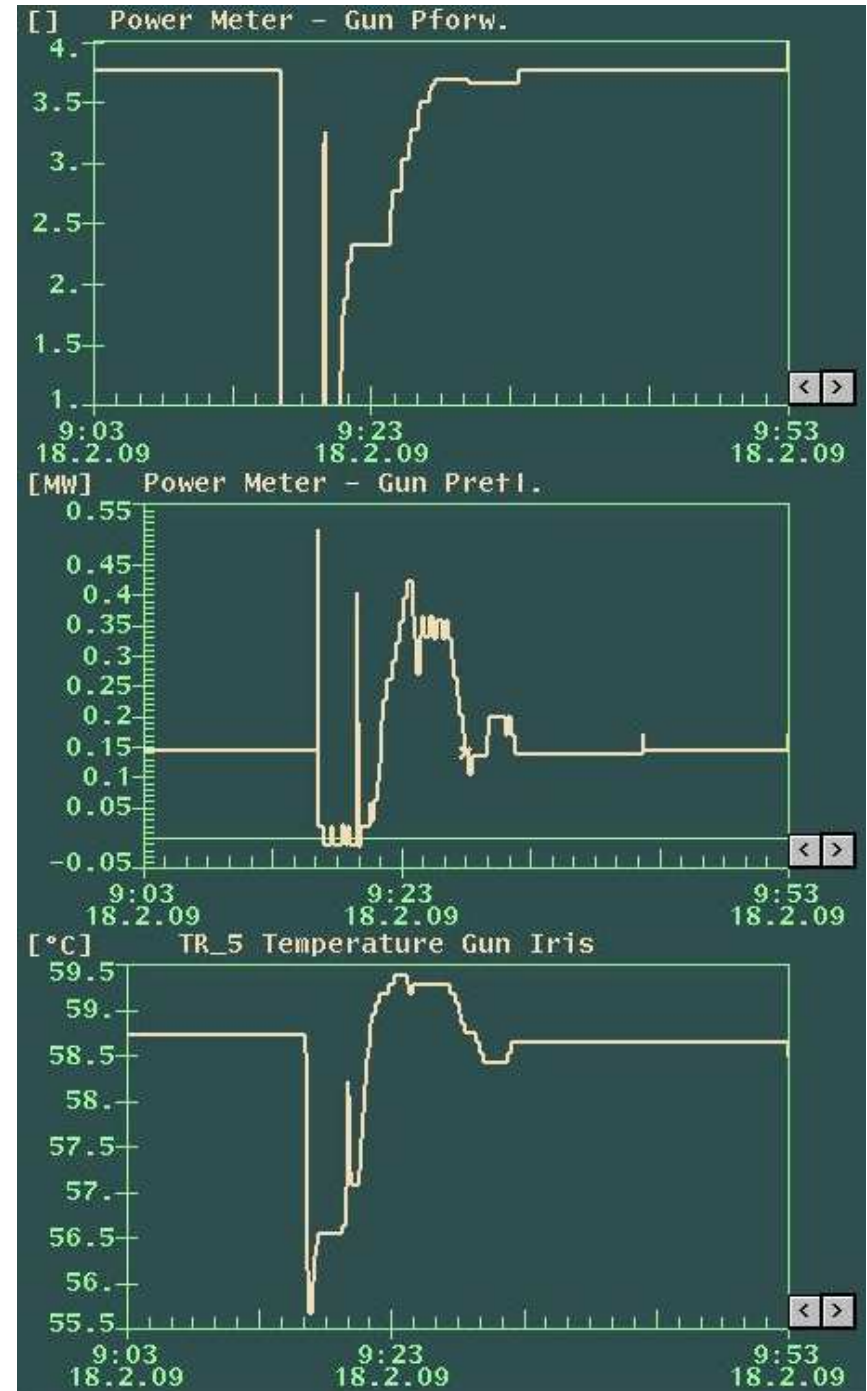
# Gun control in transients



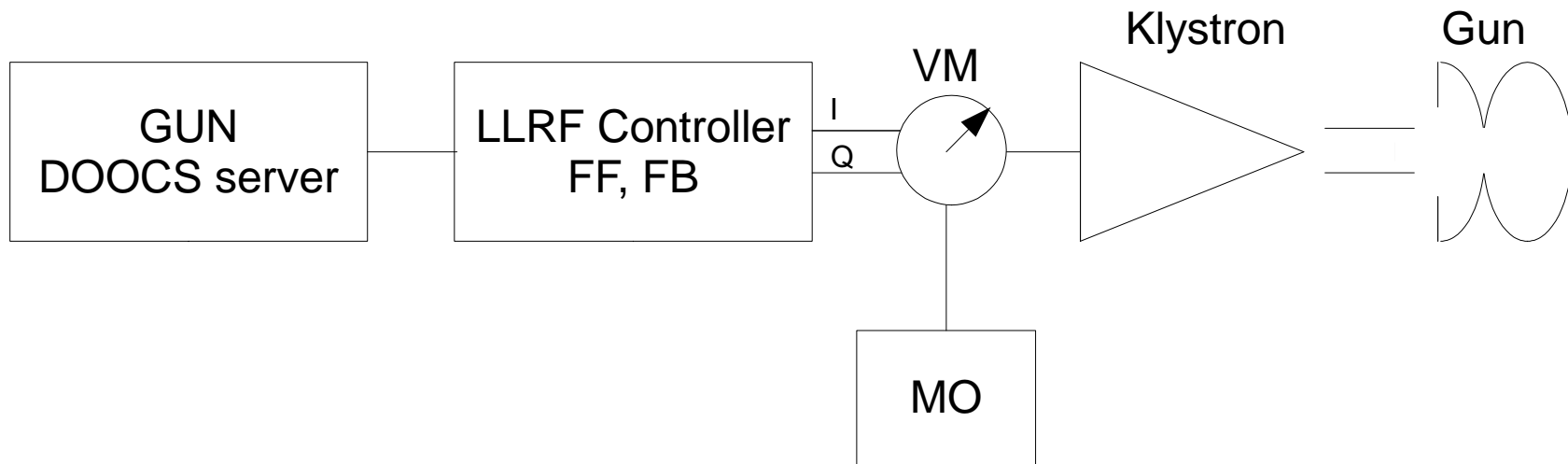
## Turning-on



## Turn-on after interlock

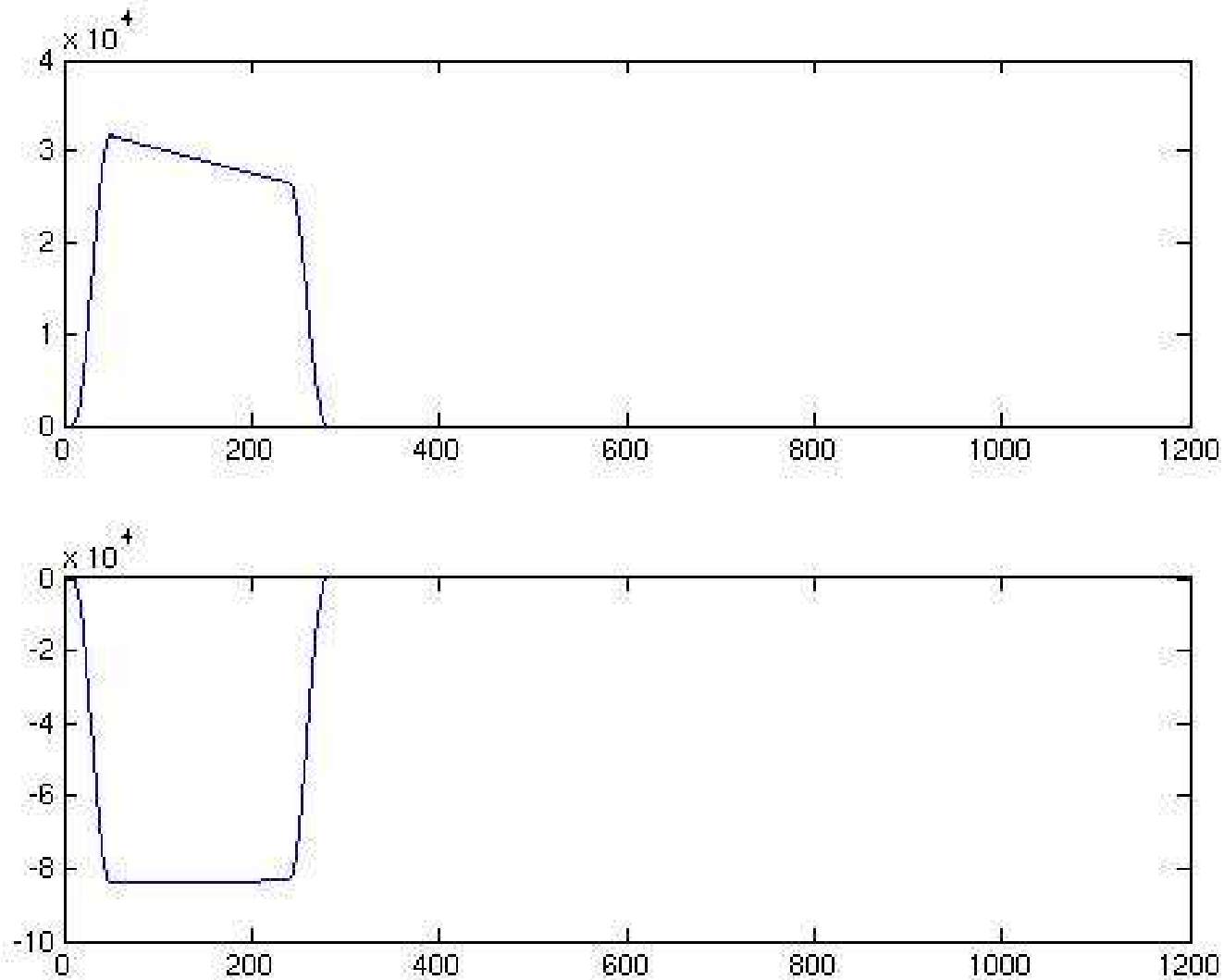


# RF control for the Gun



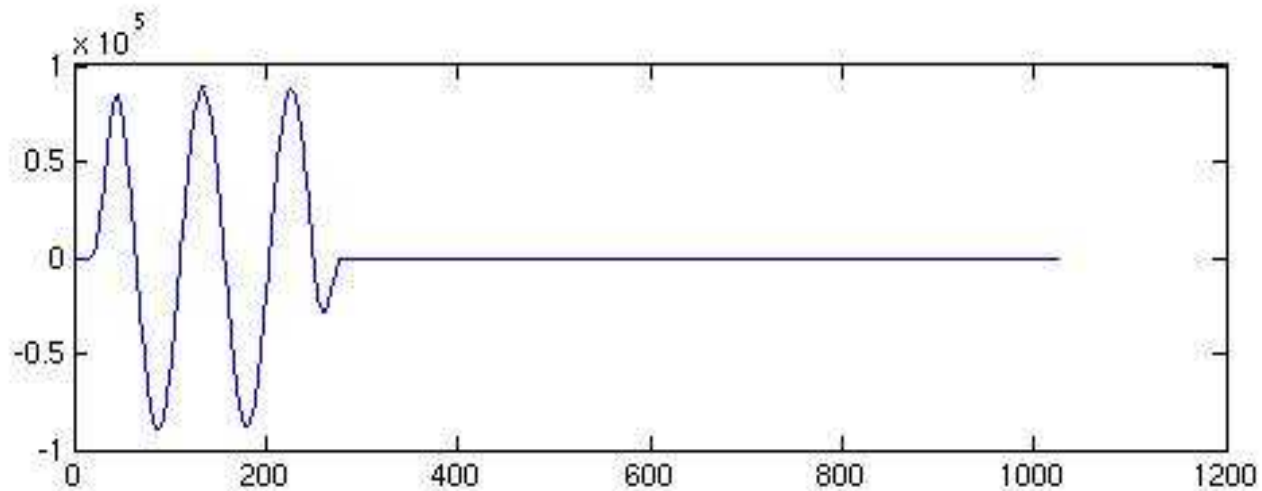
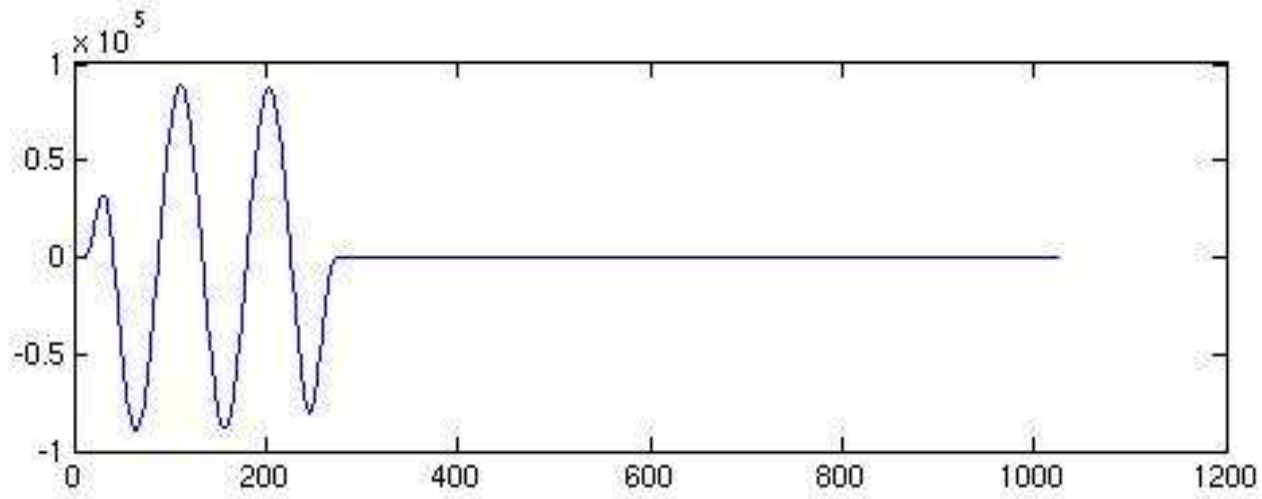
- FF tables are calculated by Gun DOOCS server according to requested operating conditions and uploaded to the controller (SimCon FPGA)
- for changing frequency of RF power one need to modulate FF tables

# Calculated FF table for detuning 0Hz

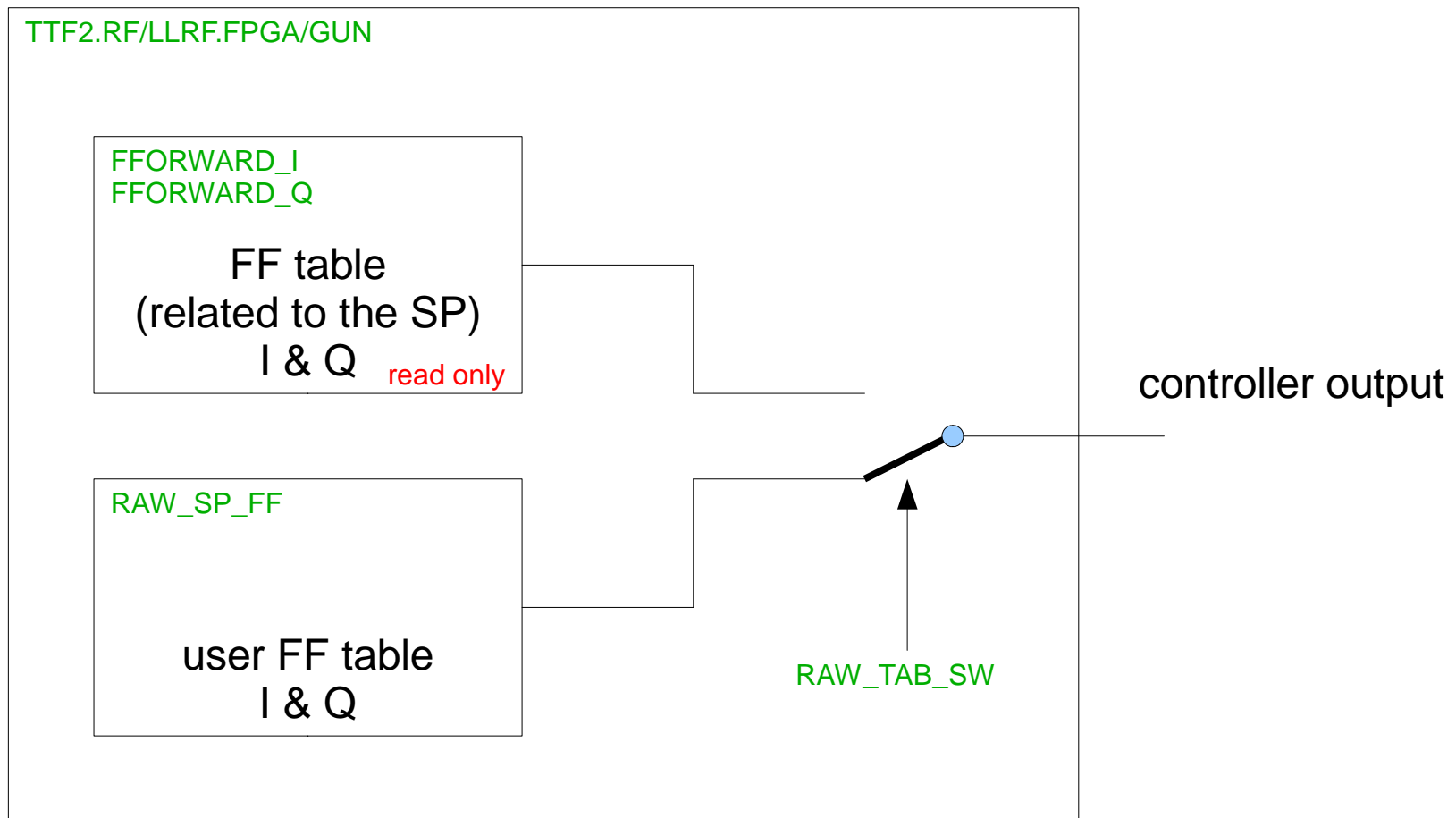




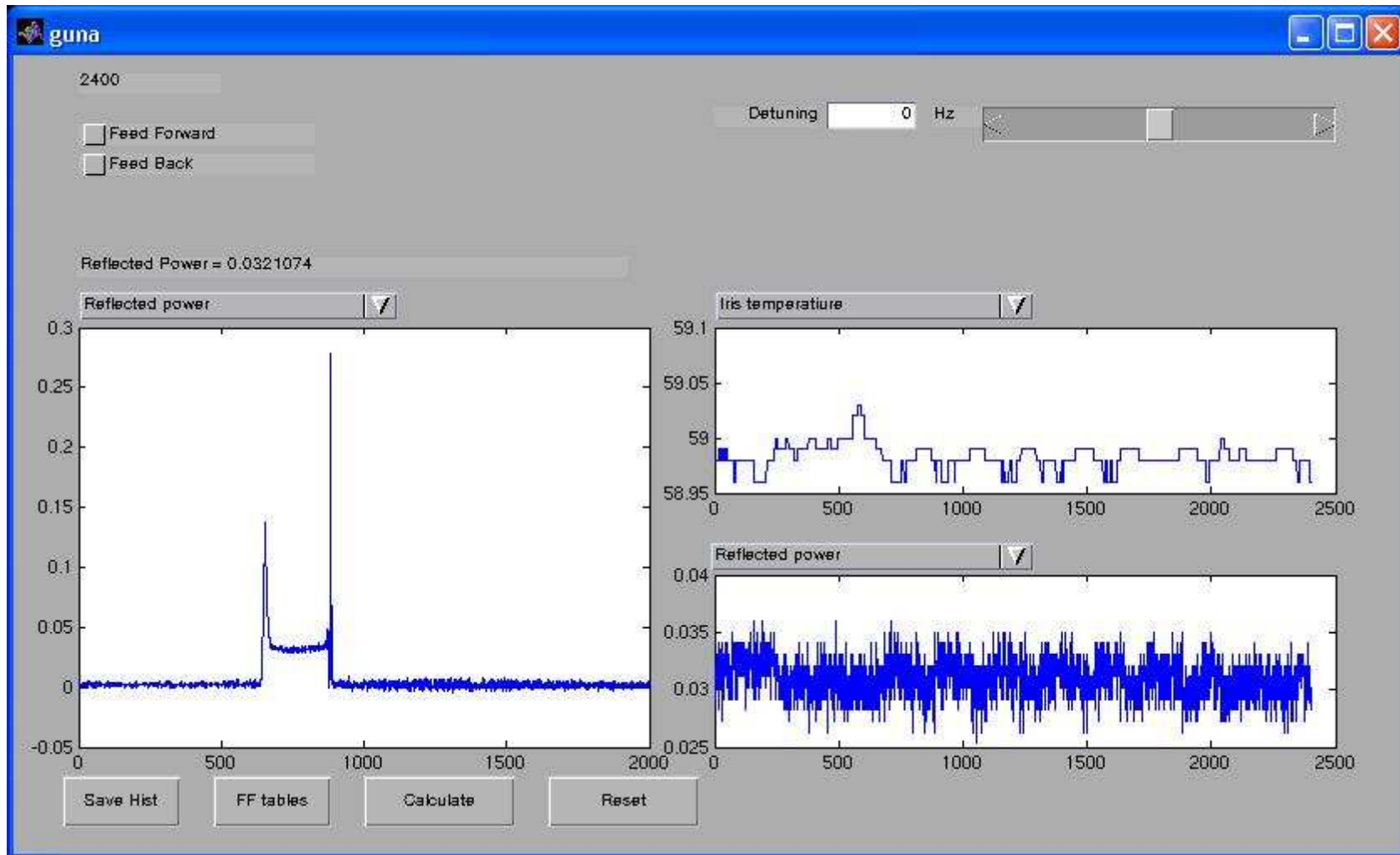
# Calculated FF table for detunning 4kHz



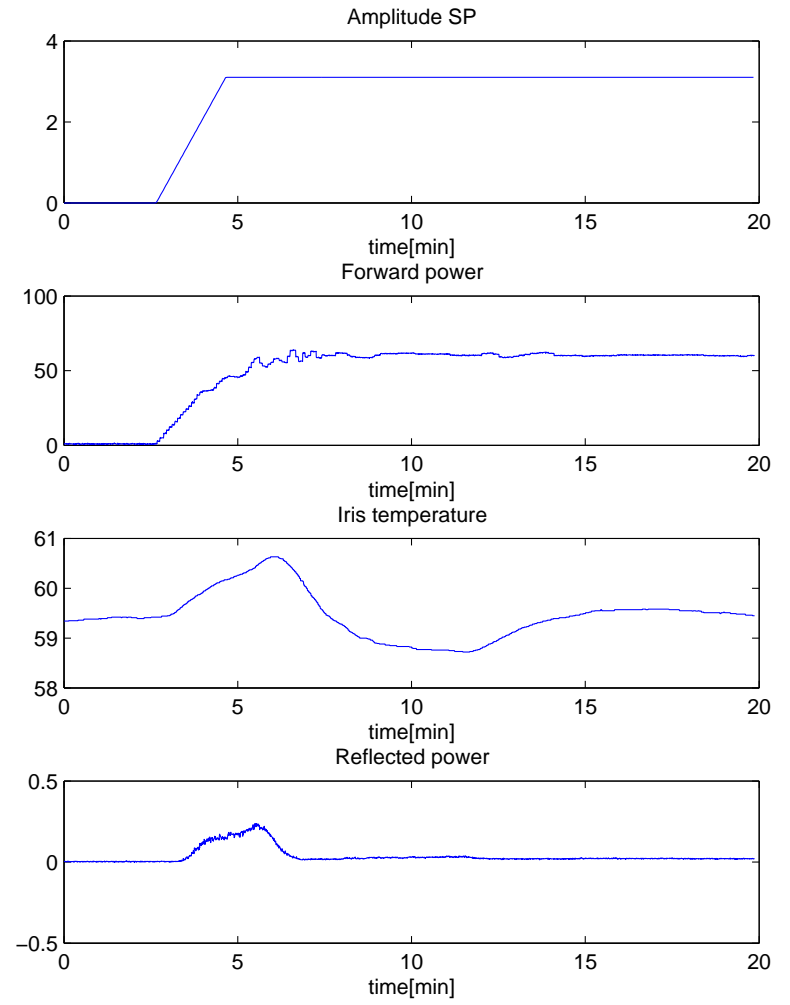
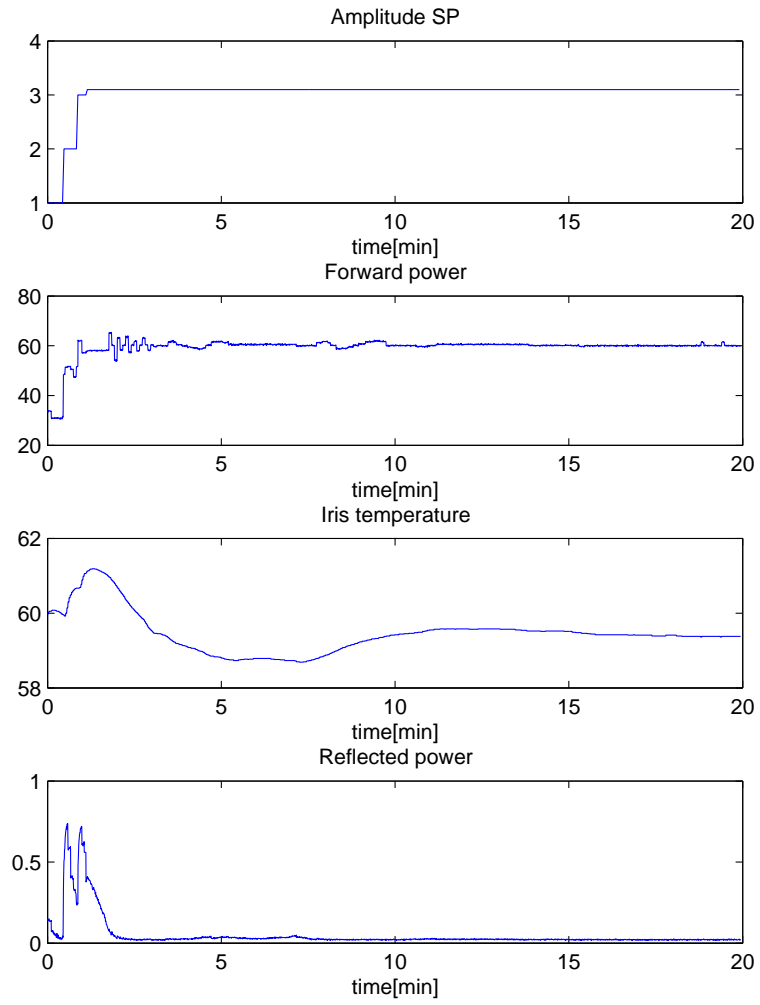
# Gun DOOCS server (after modifications)



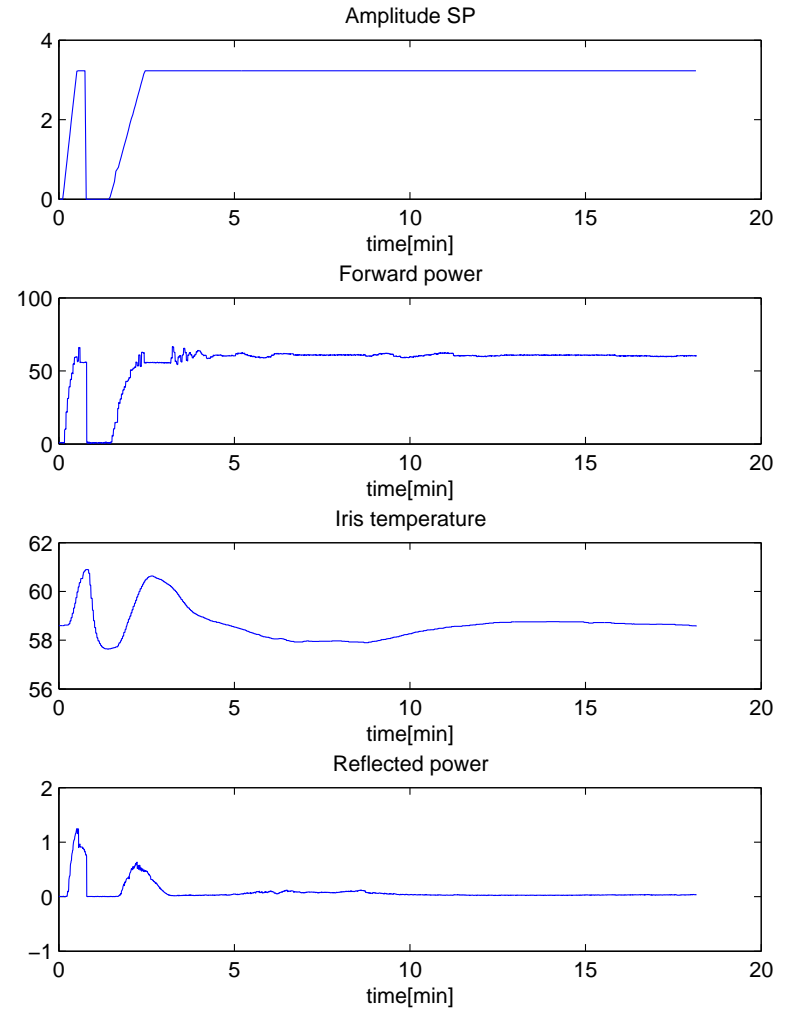
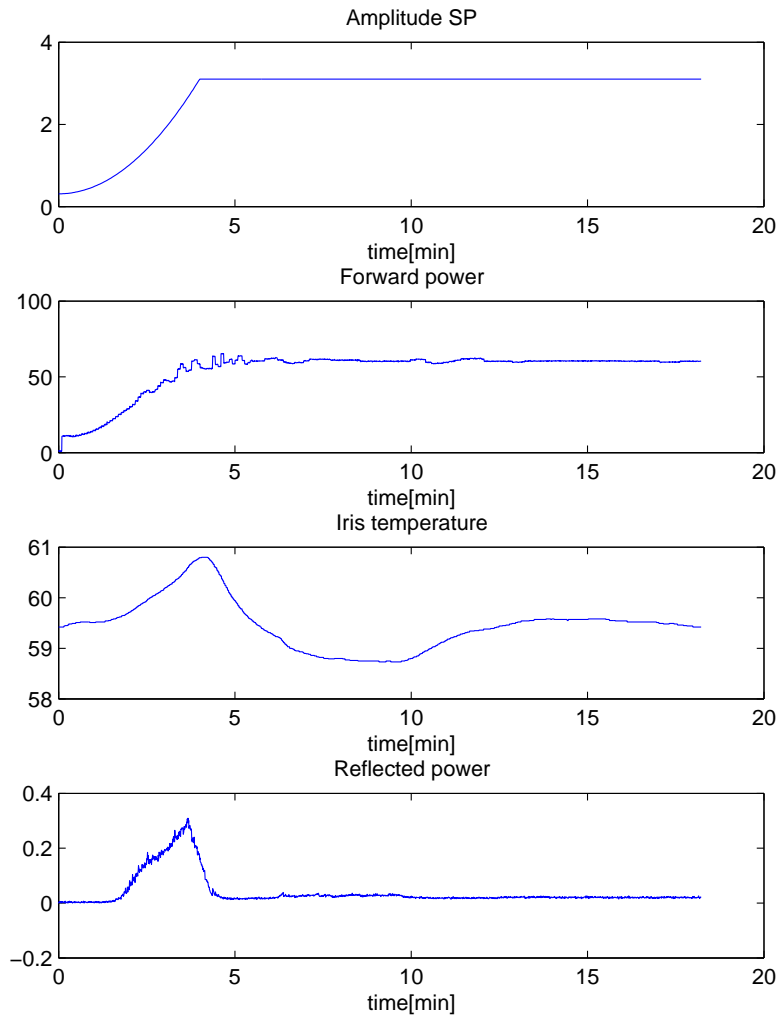
# Matlab GUI for Gun control



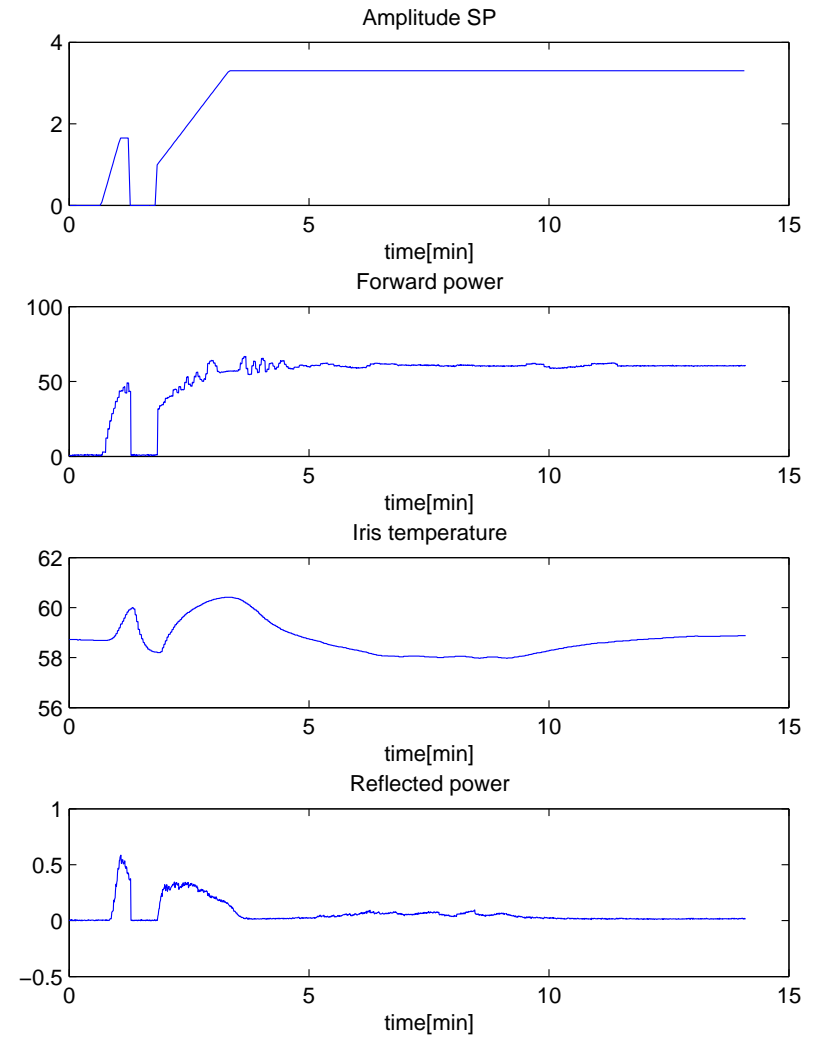
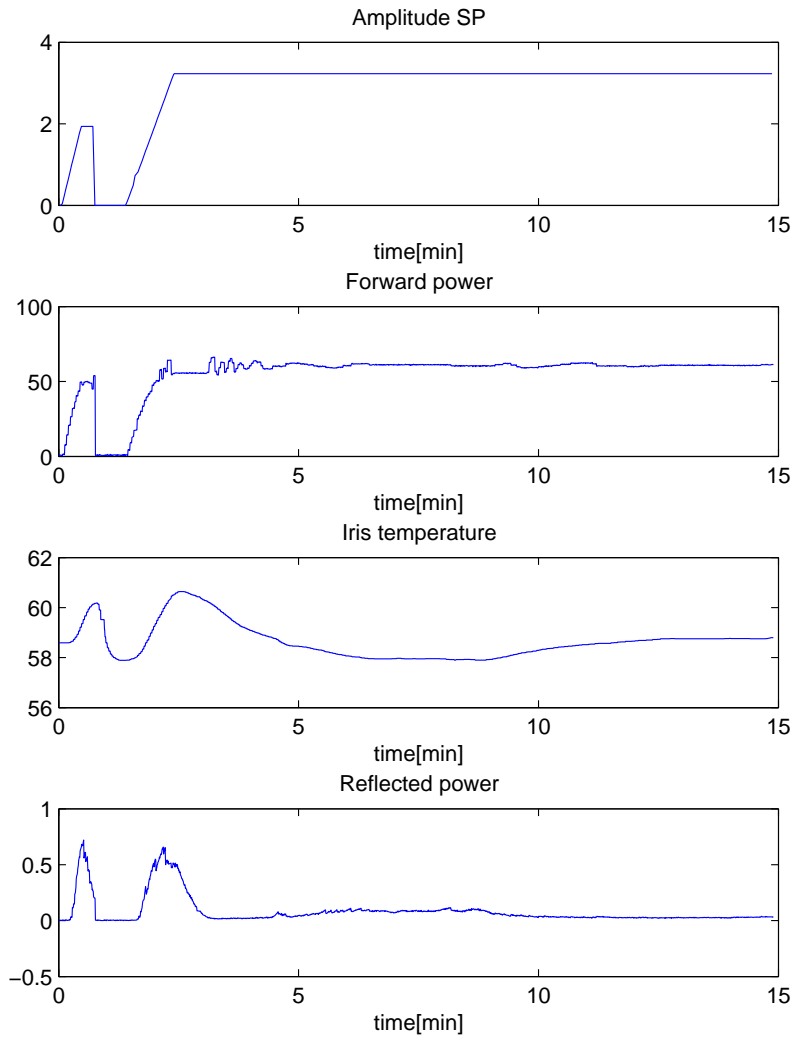
# Gun startup (1)



# Gun startup (2)



# Gun startup (3)



# Conclusion

- DOOCS server equipped with user FF tables functionality
- Matlab GUI for automatic and manual control of the Gun
- prepared Matlab script for Gun startup
- several startup-strategies tested, more will be tested